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SNOHOMISH RIVER, WASH.

LETTER

FROM

THE SECRETARY OF WAR,

TRANSMITTING,

WITH A LETTER FROM THE CHIEF OF ENGINEERS, REPORT ON
PRELIMINARY EXAMINATION OF SNOHOMISH RIVER, WASH.,
TO THE HEAD OF NAVIGATION.

JANUARY 23, 1914.—Referred to the Committee on Rivers and Harbors and ordered
to be printed, with illustrations.

WAR DEPARTMENT,
Washington, January 22, 1914.

THE SPEAKER OF THE HOUSE OF REPRESENTATIVES.

SIR: I have the honor to transmit herewith a letter from the
Chief of Engineers, United States Army, dated 21st instant,
together with copy of report from Maj. J. B. Cavanaugh, Corps of
Engineers, dated November 1, 1913, with map, on preliminary exami-
nation of Snohomish River, Wash., made by him in compliance with
provisions of the river and harbor act approved July 25, 1912.

Very respectfully,

LINDLEY M. GARRISON,
Secretary of War.

WAR DEPARTMENT,
OFFICE OF THE CHIEF OF ENGINEERS,
Washington, January 21, 1914.

From: The Chief of Engineers, United States Army.

To: The Secretary of War.

Subject: Preliminary examination of Snohomish River, Wash.

There is submitted herewith, for transmission to Congress, report
dated November 1, 1913, with map, by Maj. J. B. Cavanaugh, Corps
Engineers, on preliminary examination of Snohomish River, Wash.,
the head of navigation, called for by the river and harbor act
approved July 25, 1912.

2. The Snohomish River is formed by the union of the Snoqualmie and Skykomish Rivers. Near its mouth it divides into four channels, known as Union Slough, Steamboat Slough, Old River, and Ebey Slough. The district officer reports that Union Slough is completely blocked to navigation at its lower end by a pile bridge, but of value to navigation as a place for storage of logs. No improvements are needed in it. Present depths in Ebey Slough and Steamboat Slough are ample to accommodate present and prospective commerce, and Old River is now under improvement to a depth of 8 feet at mean lower low water to the head of Steamboat Slough. The depths in the main river up to Snohomish city are ample for existing and reasonably prospective traffic, and above Snohomish city the present depths are also ample, due to the character and limited amount of the boat traffic and the general use of this upper section of the river for floating logs. To make available and safe for navigation the depths already existing in the Snohomish River and its tributaries requires only the removal of snags and other obstructions from time to time, which is now regularly provided for under the appropriation for improving Puget Sound and its tributary waters. The district officer is of opinion that no improvement further than removal of such obstructions is now worthy of being undertaken in the United States. In this opinion the division engineer concurs.

3. This report has been referred, as required by law, to the Board of Engineers for Rivers and Harbors, and attention is invited to accompanying report, dated December 16, 1913, concurring in the views of the district officer and the division engineer.

4. After due consideration of the above-mentioned reports which concur with the district officer, the division engineer, and the Board of Engineers for Rivers and Harbors, and therefore report that no improvement by the United States of Snohomish River, Wash., to the head of navigation is not deemed advisable to a greater extent than is now authorized under existing projects.

EDW. BURR,
Colonel, Corps of Engineers,
Acting Chief of Engineers

REPORT OF THE BOARD OF ENGINEERS FOR RIVERS AND HARBORS

[Third indorsement.]

THE BOARD OF ENGINEERS FOR RIVERS AND HARBORS,
December 16, 1913

To the CHIEF OF ENGINEERS, UNITED STATES ARMY:

1. The Snohomish River, about 20 miles in length, formed by the junction of the Snoqualmie and Skykomish Rivers, flows into the Gardner, an arm of Puget Sound. It is navigable throughout its length. The Skykomish is navigable for about 6 miles and the Snoqualmie for about 30 miles.

2. This locality was examined and surveyed under authority of the act of March 2, 1907, and a comprehensive report and project, prepared to meet the needs of commerce and navigation, was adopted by the act of June 25, 1910. This project contemplates the con-

tion of tidal flows and river currents by the construction of training dikes, the reenforcement of parts of an old bulkhead, and the construction of closing dikes and mattress sills across subsidiary sloughs, and the dredging of a channel 75 feet wide and 8 feet deep at an lower low water from deep water in Everett Harbor to the mouth of Steamboat Slough, a distance of about $5\frac{1}{2}$ miles. As this project provides for all necessary work at the mouth of the river, consideration in the present report is given only to the river and its tributaries above.

3. Under existing law, these streams are being snagged. This work makes available the natural depth of the streams, which is 4 to 6 feet in the Snohomish up to Snohomish city, 12 miles above the mouth, and $3\frac{1}{2}$ feet during high stages to the head of navigation on Skykomish and Snoqualmie.

4. Logging is the principal industry on these streams, there having been carried 852,848 tons of this product during 1911, out of a total commerce of 922,893 tons. In view of the fact that existing depths in these streams are considered adequate for the limited present and prospective commerce, the district officer is of opinion that their improvement further than by the removal of obstructions already provided for is not worthy of being undertaken by the United States. In this view the division engineer concurs.

5. Interested parties were informed of the unfavorable report of the district officer and given an opportunity of presenting their views to the board, but no communications on the subject have been received.

6. From the information now available, it is found that the improvement of the lower portion of the river is provided for under an approved, comprehensive project, and that the natural depths in the Snohomish and its principal tributaries are made available by the removal of obstructions from time to time under appropriations for improving the tributary waters of Puget Sound. It is evident that to secure greater depths in these streams than is thus made available would require extensive work, at prohibitive cost. Moreover, the existing depths appear sufficient to meet the present needs of navigation, and therefore the board concurs in the views of the district officer and the division engineer and reports that in its opinion it is not advisable to undertake any additional improvement in the Snohomish River, Wash., to the head of navigation at the present time.

7. In compliance with law, the board reports that there are no questions of terminal facilities, water power, or other related subjects which could be coordinated with the suggested improvement in such a manner as to render the work advisable in the interests of commerce and navigation.

For the board:

W. M. BLACK,
Colonel, Corps of Engineers,
Senior Member of the Board.

PRELIMINARY EXAMINATION OF SNOHOMISH RIVER, WASH.

UNITED STATES ENGINEER OFFICE,
Seattle, Wash., November 1, 1913.

From: The District Engineer Officer.

To: The Chief of Engineers, United States Army
(Through the Division Engineer).

Subject: Preliminary examination of Snohomish River to the head of navigation.

1. In compliance with section 2, river and harbor act of July 2, 1912, and instructions contained in your letters, dated August 3, 1912, and September 24, 1912, respectively, the following report is submitted on a preliminary examination of the Snohomish River, Wash. to the head of navigation, with map, as required.

2. Previous examinations of this river were reported in Annual Reports of the Chief of Engineers, United States Army, for the years 1881, page 2614; for 1893, page 3462; for 1904, pages 3652-3656; and in House Document No. 1108, Sixtieth Congress, second session.

3. The Snohomish River, formed by the union of the Snoqualmie and Skykomish Rivers, is an important river in the western part of the State of Washington. It has its source in the Cascade Range mountains, between the forty-seventh and forty-eighth parallels north latitude, and flows in a general northwesterly direction in Port Gardner, an arm of Puget Sound. The distance from its mouth to the junction of the Skykomish and Snoqualmie Rivers is 20 miles and from this junction to the head of navigation on the Skykomish is about 6 miles and on the Snoqualmie is about 30 miles. The river is $1\frac{1}{4}$ miles wide at its mouth, which is considered to be between the highlands, Priest Point on the north and Preston Point on the south.

Immediately above the mouth the river separates into four tidal channels (Union Slough, Steamboat Slough, Old River, and Ebey Slough), the first three uniting 3 miles inland, and the fourth (Ebey Slough) joining the main channel 4 miles above. These channels vary in width from 100 to 400 feet.

Union Slough is narrow and shallow and is completely blocked to navigation at its lower end by the close pile bridge of the Great Northern Railway. It is used as a storage place for logs, and, since the present depth is ample for rafting and the tidal currents with the reversal of flow facilitate the sorting and towing of logs, the present use of this slough is its most valuable one for purposes of navigation. No improvements are needed in it.

Ebey Slough is a navigable highway, but is narrow and crooked. It has one steamboat and two small boat connections with Steamboat Slough.

Steamboat Slough, as far as natural conditions for navigability are concerned, is the most important of all the mouths of the Snohomish River and is used principally by the vessels entering and leaving the river. It has ample width and sufficient depth of water for any craft that can cross the tide flats beyond the mouth of the river.

The Old River was originally so shallow that it was practically impassable at low water, but the construction of training dikes across the tide flats, the removal of snags, log booms, and other obstructions, and dredging, have given depths in this channel about equal to the

Ebey Slough. The Old River from Lowell to Everett Harbor is present under improvement by the Federal Government in accordance with a project reported in House Document No. 1108, Sixtieth Congress, second session, authorized by the river and harbor act of June 25, 1910. As all necessary work on this mouth of the river is already provided for and nearing completion, the scope of this examination is not considered as embracing this outlet of the river covered by this project.

4. The tides in Puget Sound are large and extremely irregular. At Everett the extreme tidal variation is 18 feet. During times of low water in the river and low tides the depth of water over the bars at the outer end of the slough channels is only about 1 foot, this depth being entirely furnished by the fresh river water flowing over the tide-flat channel. During medium stages of the river and of the tide, ordinary stern-wheel river and sound boats of 4 to 6 feet draft can enter the river via Old River, Ebey and Steamboat Sloughs, and go up to Lowell and Snohomish city. During high-water and high-tide stages vessels of from 8 to 10 feet draft can reach Snohomish city, 12 miles from the mouth.

The tides ascend ordinarily to Snohomish city, 12 miles, with an extreme range of 8 feet, and during very low stage and high springs the Forks, 8 miles higher.

5. The floods of the Snohomish and its tributaries occur in the late summer, from May to June, from melted snow, and in the fall from rains melting the first snows.

Low water prevails during August and September, and from the middle of December to the end of February, and a medium stage generally during March and April. The lowest stage occurs usually about the end of January.

From Snohomish city to Tolt on the Snoqualmie, and to a point about 6 miles above the fork on the Skykomish, boats can carry 3½ feet during high stages and 18 inches at all times.

From the mouth to the head of Ebey Slough the banks are from 3 to 10 feet above the level of spring high tides. From the head of Ebey Slough to the Forks where the Snoqualmie and Skywamish meet, the banks are from 8 to 20 feet and at some points 30 feet high, composed of sandy loam with occasional outcroppings of soft sandstone with an average width of channel of 300 feet.

Above the Forks the Skykomish is from 250 to 300 feet wide and runs in a current rapid. The channel is tolerably straight. The bed of the river is of gravel, without rocks. Gravel bars, occurring at intervals of about half a mile, create a succession of riffles and smooth reaches. The stream is navigable at low water for 6 miles; above this it is a mountain stream, with high and precipitous banks, thickly wooded. Above the Forks to Tolt the Snoqualmie runs between banks from 20 to 30 feet high, with an average width of 250 feet.

The average width of the valley between Tolt and the head of Ebey Slough is 2½ miles. The soil is principally a rich loam, covered with an undergrowth easily removed. Tributary to the river is a large amount of fir, cedar, cottonwood, and spruce timber of fine quality, the last two growing mostly along the river banks.

Below the head of Ebey Slough the land is flat, from 1 to 3 feet above the highest tides, covered with rosebush and crab apple, except at the mouth, where the growth consists principally of grass and

rushes. The tide lands cover about 30 square miles, a large portion of which has been diked and turned into farming and grazing land. Above the tide lands the banks are very rarely overflowed.

8. The Great Northern Railway runs through the city of Everett at the mouth of the Snohomish River, passing along the shore of Puget Sound and then up the Snohomish and Skykomish to the summit of the Cascade Mountains. A branch crosses the Snohomish and keeps up the shores of Puget Sound to Bellingham and Blaine. The Everett & Monte Cristo Railroad goes from Everett to the Monte Cristo mines, near the summit of the Cascades. These railroads which furnish ample transportation facilities, carry out practically all the agricultural and dairy products of the valleys, and the main use of the rivers is for floating of logs.

9. Logging is in active progress all along the Snoqualmie and for 30 miles up the Skykomish. Logs are brought in by rail and dumped into the river at Fiddlers Bluff, about 15 miles above the mouth, and then either floated or towed down the river to the mills below. Between Fiddlers Bluff and Snohomish city one large and several smaller river towboats are used by lumber companies. Above Fiddlers Bluff occasional small lumber patrol and towboats and small gasoline launches use the river.

10. The principal work of improvement carried on above the head of Ebey Slough consists in snagging and removal of other obstructions over the navigable portion of the river and its tributaries (provided for under the general appropriation for improving the tributary waters of Puget Sound).

In accordance with a project printed in House Document No. 16 of the Fifty-eighth Congress, second session, a training dike was partially constructed and a small amount of dredging done at Stretches Riffle 18 miles above the mouth, to eliminate a bad bend and to obtain navigable depth over the bar at low water, but the work was never completed. While conditions were somewhat improved by work possible with funds available, the fall over the riffle is excessive in regulation, being 6 to 8 feet per thousand, and further expenditure at this locality were not considered advisable.

With the exception of the minor change at Stretches Riffle, the general condition of the upper reaches of the stream and its tributaries is the same as that described in the report of an examination of the Snohomish River printed in annual report, Chief of Engineers, 1881, pages 2614-2616, inclusive.

11. Present depths in Ebey Slough and Steamboat Slough are ample to accommodate present and prospective commerce, and the River is now under improvement to a depth of 8 feet at mean low water to the head of Steamboat Slough. The depths in the main river up to Snohomish city are ample for existing and reasonable prospective traffic, and above Snohomish city the present depths are ample also, due to the character and limited amount of the boat traffic and the general use of this upper section of river for floating logs.

To make available and safe for navigation the depths already existing in the Snohomish River and its tributaries, it is merely necessary to remove the snags and other obstructions that occur from time to time, and this work is now regularly provided for under

the appropriation for improving Puget Sound and its tributary waters.

12. The commerce of the Snohomish River and its tributaries is made up almost entirely of timber products, and for 1911 the amount and value were as follows:

Snohomish River.

Article.	Amount.	Short tons.	Value.
.....pieces..	1,129,000	287	\$1,670
.....e rock and clay.....		6,363	14,700
.....feet b. m..	421,423,900	852,848	3,661,564
.....do.....	23,391,000	35,087	259,619
.....		200	10,000
.....		150	15,000
.....linear feet..	638,303	1,690	150,000
.....cords..	600	13,200	35,973
.....pieces..	1,300,000	900	2,100
		130	2,210
Total.....		910,855	4,152,836

Snoqualmie River.

.....feet b. m..	6,019,110	12,038	\$54,172
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3. The bridges occurring on the stream and its tributaries are all of ample span. The terminals are principally in the form of log dumps for transfer of logs from rail to water. Above the mouth of Snohomish no wharves exist on the river and none is needed. At Snohomish city adequate water terminals exist. At Everett, other terminals are located along the water front, as well as along the west bank of the Snohomish River. These water terminals, with the exception of the Great Northern Railway terminals, are open to all other carriers, on equal terms, subject to wharfage charge limited by the laws. The terminals are ample and generally efficient, although modern methods of quick transfer of freight are used. The large wharf terminal constructed by the Great Northern Railway was for exclusive use, but during the past few years has not been used for any purpose. The terminals at Everett are of course primarily for lumber terminals.

A physical connection exists between three of the water terminals and the Great Northern Railway, but so far as known no contracts exist for the interchange of traffic between the water carriers and the railroads. There are three railroads at this point: The Great Northern Railway, Northern Pacific Railway, and Chicago, Milwaukee & Puget Sound Railway. It is not known what public water frontage is available for wharves, etc., exists at Everett, Lowell, Snohomish, and other cities on this river, but it is known that no monopoly of such water frontage exists and that water frontage can easily be purchased at a reasonable price in any of these places.

In view of the fact that present depths in the Snohomish River and its tributaries are adequate for the limited present and prospective commerce, I am of opinion that the improvement of these streams, other than by the removal of obstructions as already provided for, is not worthy of being undertaken by the United States.

15. In compliance with law, I have to report, also, that it is not practicable to coordinate with any improvement of the river, either flood protection or the development and utilization of water power for commercial purposes so as to reduce the cost of improvement and render it advisable. While there is much erosion of banks at various points on the rivers, navigation is not injured thereby, and the cost of any revetments would be paid properly by the lands benefited.

J. B. CAVANAUGH,
Major, Corps of Engineers.

[First indorsement.]

UNITED STATES ENGINEER OFFICE,
NORTHERN PACIFIC DIVISION,
San Francisco, Cal., November 7, 1913.

To the CHIEF OF ENGINEERS, UNITED STATES ARMY:

Concurring in the views expressed by the district officer.

THOS. H. REES,
*Lieutenant Colonel, Corps of Engineers,
Division Engineer.*

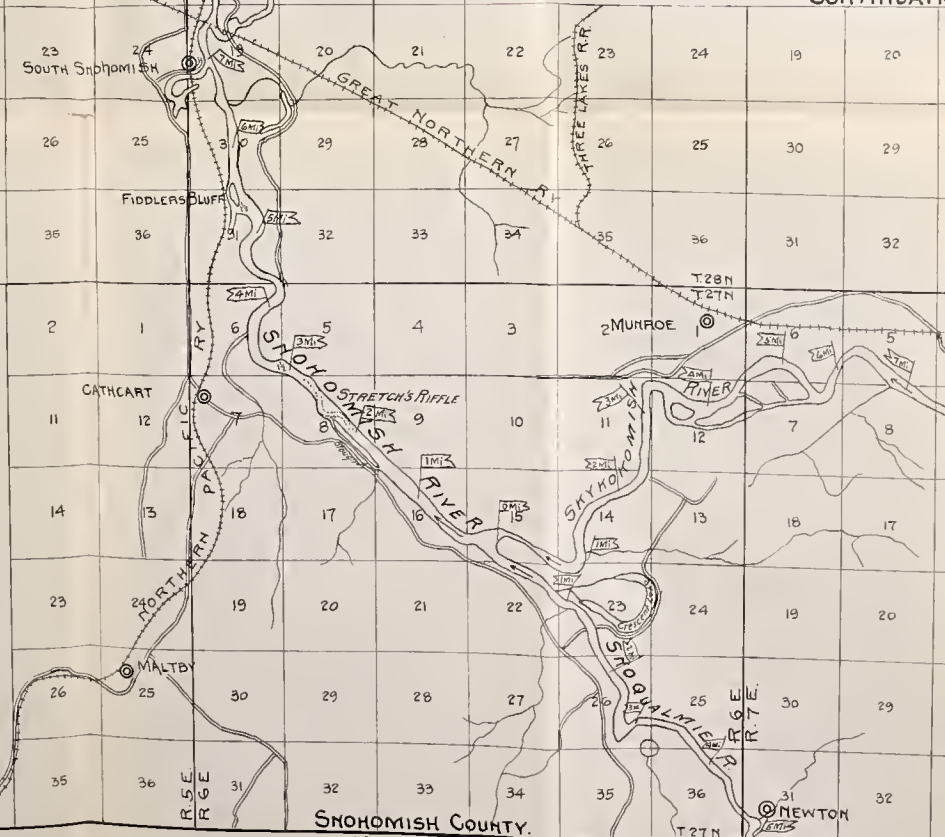
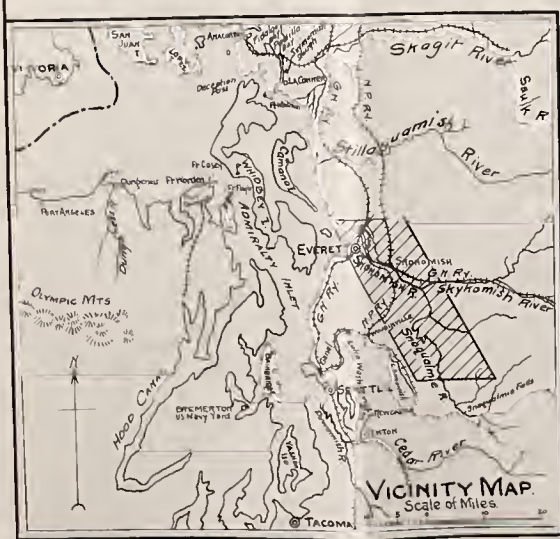
[For report of the Board of Engineers for River and Harbors see page 2.]

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WAR DEPARTMENT.



CONTINUATION OF THE SNOQUALMIE RIVER.



EXAMINATION OF SNOHOMISH RIVER, WASH.

Prepared under direction of Major J.B. Cavanaugh,
Corps of Engineers, U.S. Army.

— W.T. Preston, Assistant Engineer —
Scale 1 inch to 1 mile.

Soundings are in feet and are referred to M.L.L.W.
Mile stations are approximate and are numbered down
the Snohomish, and up the Snoqualmie and Skykomish from
their junction.

U.S. Engineer Office, Seattle, Wash.,
With report of Nov. 14, 1913, to the Chief of Engineers.

J.B. Cavanaugh
Major, Corps of Engineers, U.S. Army.

R.A. Davies, Jr. Engr. Do.

